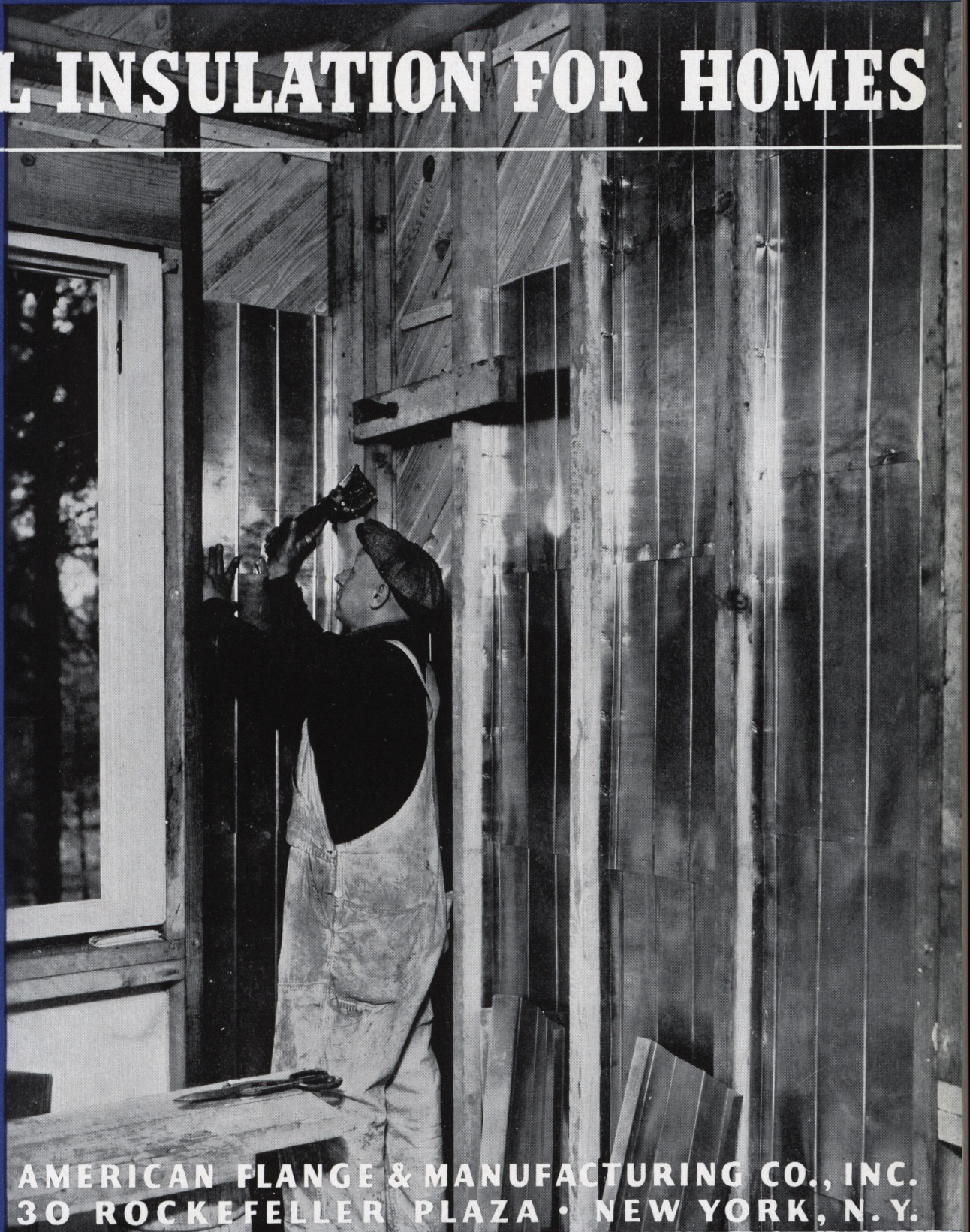


# *Ferro-Therm*

**METAL INSULATION FOR HOMES**



**AMERICAN FLANGE & MANUFACTURING CO., INC.  
30 ROCKEFELLER PLAZA • NEW YORK, N. Y.**

**HOGAN AND COMPANY, NATIONAL DISTRIBUTORS  
383 MADISON AVENUE • NEW YORK, N. Y.**



# $\frac{10}{4}$ INSULATION Pays for Itself

## THE NECESSITY OF BUILDING INSULATION IS GENERALLY ACKNOWLEDGED



Apt. House, N. Y. City, Insulated with *Ferro-Therm*  
Arch. H. I. Feldman



Bank Buildings, Insulated with *Ferro-Therm*  
Arch. Randolph H. Almiroty

Within recent years a great amount of thought and study has been given to the problem of thermal insulation for residential construction.

Insulation has played an important part in industry for many years but consideration of its application and its importance in home construction has had a slow advancement.

The introduction of air conditioning and the necessity of reducing the cost of heating with modern fuels such as oil and gas have resulted in the development of insulation.

### Proper Protection of a Building Against Heat Losses Necessitates:

**Insulation**—As it has been found that the greatest losses are through the walls and roof, these areas must be constructed with proper insulating materials.

**Reduction of Infiltration**—Good construction of walls, floor and roofs and proper fitting or weatherstripping of doors and windows to eliminate infiltration of air.

### Insulation Reduces:

**Heat losses in Winter**—and therefore the cost of fuel.

**Size of the heating plant required**—A smaller boiler and less radiation is required in a well insulated house.

### Insulation Produces:

**Uniform Winter warmth and comfort in the house**—Drafts and cold floors are eliminated.

**Coolness and comfort in the house in Summer**—The intense Summer heat cannot penetrate through insulated walls and roof. The entire house is cool and comfortable day and night.

**A sound investment**—The saving in fuel pays for the entire cost of insulation within two to five years and this saving continues for the life of the house. You save money at the same time that you are enjoying the comfort of an insulated home. On the other hand, an uninsulated home costs more to heat and does not give you the comfort. Lack of insulation costs money and comfort.

**Increased original and resale value of a house**—The value of a house is greatly increased when it is insulated. The use of insulation in fine residences is now practically universal and is demanded by real estate interests. It is therefore essential that insulation be given the utmost consideration in order to protect your investment.

*Ferro-Therm* . . . AMERICAN FLANGE & MANUFACTURING CO., INC.



## Correcting Some Old Impressions Regarding Insulation

For years it was thought that it was necessary to have thick mass materials depending on the multitude of minute dead air cells that were contained in the mass.

This practice has been found to have certain disadvantages which have been eliminated by modern facts and practice in insulation.

### Heat Travels By Means of Three Mediums

**Conduction**—the transfer of heat from molecule to molecule in materials that are in direct contact with each other.

**Convection**—the transfer of heat by means of circulating currents which carry the heat, such as circulating air currents.

**Radiation**—the transfer of heat by means of electromagnetic waves which carry heat energy.

### Radiated Heat Most Important Factor

Of the three mediums, radiation is responsible for 66 to 85% of the total heat transfer as shown in diagram at right.

Of all common metals which have been found to reflect a high percentage of radiated heat, steel is one of the most efficient and practical as well as the strongest and most durable.

Steel reflects a high percentage of radiated heat. This means that the major portion of the total heat does not penetrate the surface of the steel at all but instead it is reflected back toward its source.

A bright mirror-like surface is not necessary for steel to maintain this high reflectivity of heat. Heat rays and light rays are entirely different in this respect. A looking glass which is the best reflector of light reflects practically no heat at all. The molecular structure of the surface is the important factor and comparatively dull steel surfaces will reflect heat as efficiently as brightly polished surfaces.

## Modern Theories and Practice in Insulation

### The Reflectivity of Heat Actually Demonstrated on a Reflectometer

The illustration below shows a reflectometer which consists of an electric heater operating at approximately 400 degrees Fahrenheit radiating heat against the material to be tested which is held in a frame a few inches from the heater. The heat that is reflected from this material is thrown back through a funnel against a thermopile, where the reflected heat energy is turned into electrical energy and recorded on an ordinary galvanometer.

A material of known reflectivity to heat, as given by the International Critical Table, is placed in the frame and the amount of heat reflected is recorded on the galvanometer. Then steel or other metals are placed in the frame, and the recording of the galvanometer shows exactly the percentage of heat that they reflect.

Materials other than metals reflect little or no radiated heat but instead absorb this heat which is carried on through them by conduction. With such non-reflecting materials it is necessary to have a mass of the substance to retard this heat that is absorbed from being conducted on through the material. Old type mass insulation materials worked on this principle employing a multitude of dead air cells in their structure to prevent this conduction.

Modern steel insulation does not absorb this heat at its surface, therefore it does not need this mass to prevent the heat from passing on through. The dead air space maintained after installation prevents the remaining portion, conducted and convected heat from passing through.

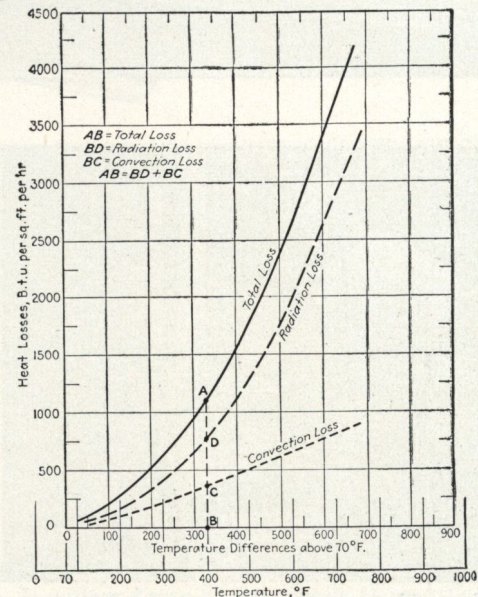
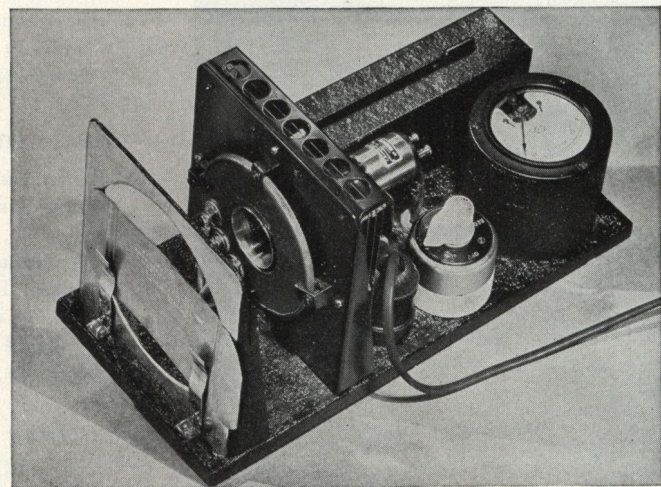


Chart of Comparative Heat Losses



The Reflectometer which Demonstrates the High Reflectivity of *Ferro-Therm*



# Ferro-Therm

(Registered Trade Mark)

*Ferro-Therm Fully Covered by Patents*



**Ferro-Therm** as It Comes to the Job



Cutting Five Sheets of **Ferro-Therm** at One Time



Flanging Five Sheets of **Ferro-Therm** after Cutting

## Sheet Steel Insulation

Ferro-Therm is a steel sheet insulation which *reflects* 95% of all radiated heat which strikes it from either side. This high reflectivity is effective throughout the entire range of temperature from sub-zero up to 1000°F. Thus, in Winter, heat inside the building is reflected back into the building from the walls and roofs, thereby reducing heat losses. In Summer, the heat waves from the sun are reflected back by Ferro-Therm from the walls and roof of the building, preventing the heat from entering the building.

Ferro-Therm sheets are especially prepared and cleaned of all scale or foreign matter. This leaves a smooth dull surface and a reflectivity of 95%, which is due to the *molecular construction* and not to the polish of the surface.

## Its Non-Corrosive Alloy Coating

Naturally the first thought is to protect the clean surface from corrosion. This is accomplished by coating it with an alloy of lead and tin which completely protects it against corrosion. This coating does not detract from the reflectivity of the steel plate whereas lacquers or paints of any kind or color would reduce the same plate so treated to 30% of its true value.

## Delivered in Handy-Sized Sheets

Ferro-Therm is made in sheets 24 x 32 inches and in 0.006 of an inch thickness, making it easy to handle as it weighs only 0.25 lbs. per square foot. It is packed flat, 600 sq. ft. to a box. Each box is identified with the American Flange & Mfg. Co. trade mark as illustrated above.

## Crimped for Extra Stiffness

On account of the lightness of the metal the sheets are crimped at 4-inch intervals in order to stiffen the sheets when in place, and to make them easy to handle on the job.

## Made to Fit Standard Spacing of Studs

The sheets are of such a size that they are adaptable to either 12 or 16 inch spacing of studs without waste, or to 20 inch spacing of roof rafters with slight waste.

The sheets are delivered flat and are then cut on the job to fit the spacing of the studs. Half the 32 inch dimensions of the sheet, or 16 inches, allows for the bending of a flange on each side for stapling between studs 16 inches on centers. Half the 24 inch dimension, or 12 inches, allows for the flange for stapling between studs on 12 inch centers.

## Cutting and Flanging the Sheets

The sheets of metal are thin, and five sheets can be cut at a time by a knife cutter, similar to a large paper cutter, as shown in the illustration.

The flanged edges are made on the sheets with a simple brake, and 5 sheets can be quickly flanged at the same time. The metal can readily be cut to fit any special shape.

## Installation by Carpenter

The entire installation of Ferro-Therm is done by carpenters.

**Ferro-Therm** . . . AMERICAN FLANGE & MANUFACTURING CO., INC.



AMERICAN  
FLANGE

## METAL INSULATION

ADVANTAGES OF *Ferro-Therm***1. Reflects 95% of all Radiated Heat**

As the greatest losses of surface heat have been found to be by radiation, the fact that Ferro-Therm will reflect 95% of radiated heat is of the utmost importance in considering insulation.

**2. Has a Dull, not Polished Surface**

The surface of Ferro-Therm is a smooth dull surface rather than a highly polished light-reflecting surface such as a mirror. Actual tests on the reflectometer show that Ferro-Therm reflects just as much heat when it is dull as when it is bright.

**3. Protected Against Corrosion or Deterioration**

The coating of lead and tin alloy assures a perfect protection for the steel against corrosion due to any ordinary atmospheric conditions in the wall or roof construction.

**4. Does not Absorb Moisture**

Being a non-absorbent and corrosion resisting metal, Ferro-Therm will not absorb moisture. Therefore, the high efficiency of Ferro-Therm is not decreased as is the case in other insulation materials that do absorb moisture. Furthermore the reflection of heat by the Ferro-Therm sheets actually keeps the air space warm and dry. This serves to keep the plaster of the walls and ceiling dry, thereby preserving the plaster decorations.

**5. Does not Settle or Pack Down**

Ferro-Therm cannot settle or pack down because the steel sheets are stapled permanently in place. Loose mass types of insulation do settle and pack down from vibration and gravity and their efficiency decreases accordingly. Ferro-Therm cannot be affected in this way.

**6. All Metal, Non-Combustible**

Ferro-Therm is all metal, with strength and rigidity and is non-combustible. Ferro-Therm being of steel affords a very definite fire stop.

**7. Vermin-Proof**

Being metal, Ferro-Therm will not support or harbor vermin. Termites, rodents and insects cannot penetrate Ferro-Therm.

**8. Light in Weight**

Ferro-Therm weighs only 0.25 lbs. per square foot with a thickness of 0.006 inches or United States gauge No. 38.

**9. Not Readily Damaged**

Ferro-Therm has the structural strength and stiffness of steel and is not easily damaged.

**10. Easily Handled and Installed**

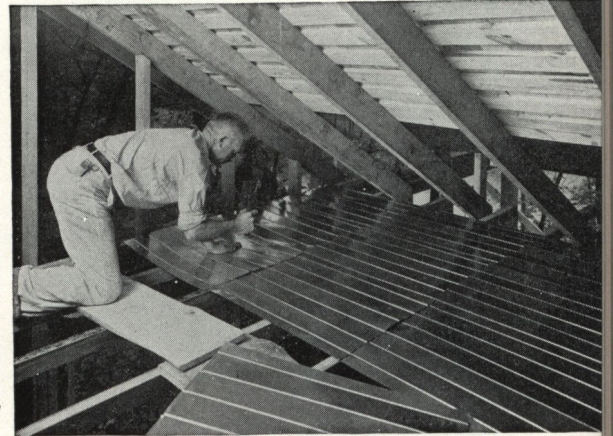
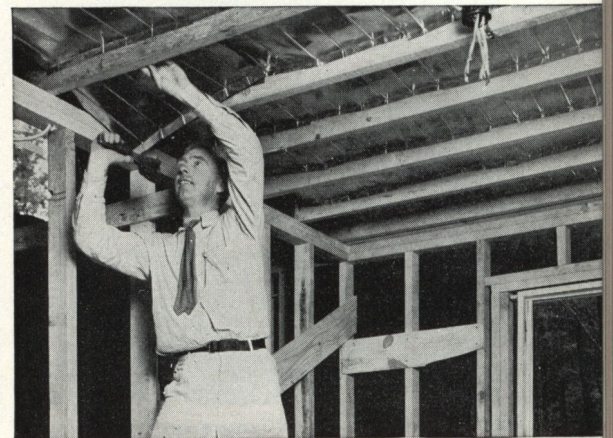
Being light in weight and in small sheets the insulation is easily handled on the job. Five sheets are generally cut at a time on account of the thinness of the metal. A carpenter can install on an average of from 600 to 800 sq. ft. a day in an ordinary frame house construction.

**11. *Ferro-Therm* Affords Definite Fire Protection**

Due to the fact that Ferro-Therm is steel which will not burn and will reflect heat above 1000°F. the wood framework of the house inside the Ferro-Therm is protected from the penetration of fire for a reasonable period.

**12. Protects Studs from Dry Rot**

Protection of house construction prevents rotting from moisture. Ferro-Therm cannot absorb moisture from the air and therefore does not convey any moisture to the frame work which would cause the wood to rot. The air space maintained by the method of installation of Ferro-Therm also eliminates any chance of dry rot.

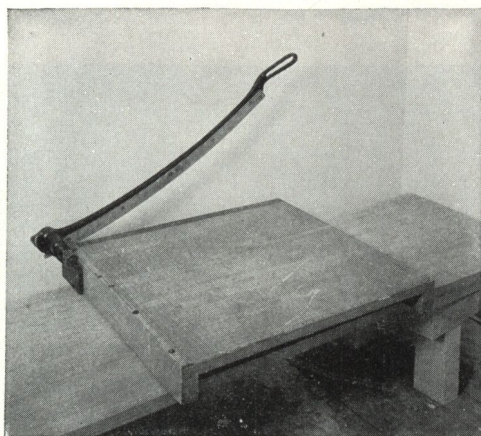
Installing *Ferro-Therm* Sheets Over Attic BeamsInstalling *Ferro-Therm* Between Ceiling or Floor BeamInstalling *Ferro-Therm* in Frame WallAMERICAN FLANGE & MANUFACTURING CO., INC.... *Ferro-Therm*



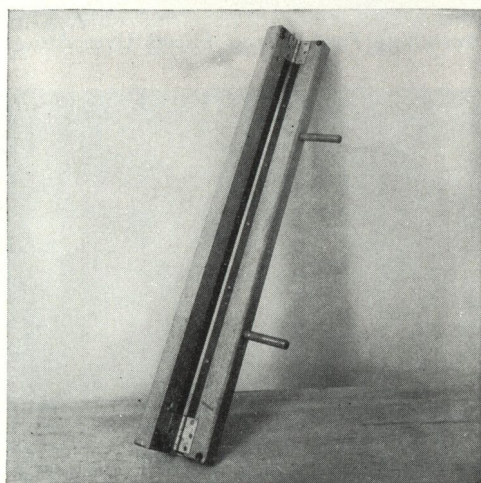
# THE INSTALLATION OF *Ferro-Therm*

(Registered Trade Mark)

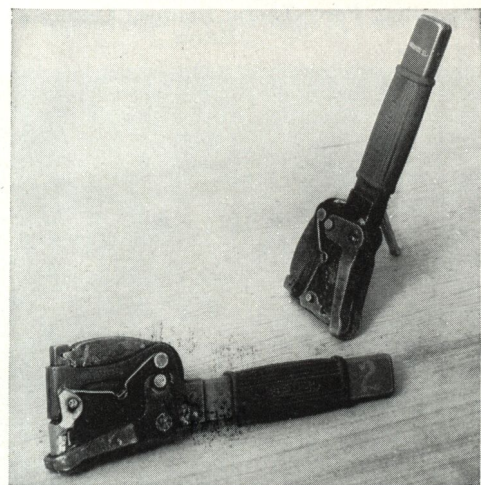
*Ferro-Therm Fully Covered by Patents*



The Cutting Tool for *Ferro-Therm*



Brake for Forming Flanges on *Ferro-Therm*



Magazine Stapling Hammer for Installing  
*Ferro-Therm*

Ferro-Therm is delivered to the job in cases containing 112 sheets standard size 24 x 32 inches.

The light weight, convenient size, and lack of bulk makes handling and storage of Ferro-Therm very simple.

## Cutting Sheets

The first operation is to cut the sheets of Ferro-Therm if they are to be installed between studs or rafters. For 16-in. center studs the sheet is cut in half on the 32-in. dimension making 2 sheets 16 x 24 ins. For 12-in. center studs the sheet is cut on the 24-in. dimension making 2 sheets 12 x 32 in. The sheets are cut on a cutting board similar to a large paper cutter. Five or six sheets may be cut at one operation.

## Flanging Sheets

After cutting, the edges of the sheets are flanged from  $\frac{1}{2}$ -in. to 1-in. depending on the exact spacing of the studding. The flanging is done on an ordinary brake consisting of two 2 x 4's hinged together, one of them being fastened to the floor or bench. The sheets are put between the 2 x 4's with the desired flange dimension extending through and then the free 2 x 4 is turned over flanging the sheet as it does so.

## Installation of Furring Strips

Ordinary wood lath or  $\frac{1}{2}$ -in. furring strips are cut in lengths to fit between the studs. These are nailed to the inside face of the wood sheathing between the studs, starting at the floor and spacing the lath every 24 or 32 inches depending on the length of the sheets of Ferro-Therm.

The sheets of Ferro-Therm are then stapled to the lath overlapping the sheets approximately 1 inch. The sheets are also stapled directly to the studs, stapling them through the flanged edges. By installing Ferro-Therm in this manner a definite series of dead air spaces or blankets is maintained between the sheets and the sheathing.

## Installation Tools

Stapling is done by means of automatic stapling hammers which hold approximately 100 staples in a magazine. This speeds up the installation.

Cutting boards, flanging machines and stapling hammers are available on loan from the American Flange and Mfg. Co.

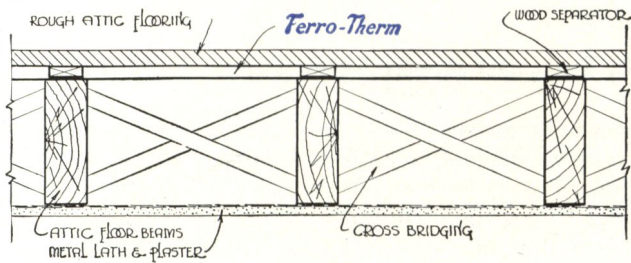
## Installation of *Ferro-Therm* Over a Second Floor Ceiling

It is also practical to install the sheets flat on the face of the ceiling joists. This is the common practice where the attic is to be left unfinished with no flooring. In this method each sheet spans two joists and is stapled directly to the face. If a floor is desired later it is simply necessary to nail furring strips along the joists over the Ferro-Therm and then apply the flooring directly on the furring strips.

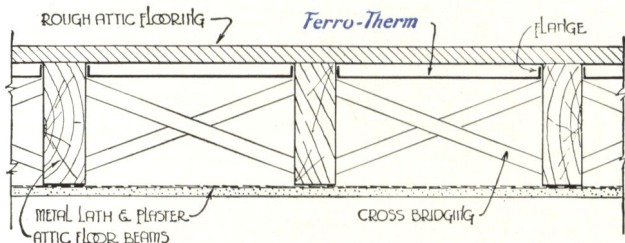
*Ferro-Therm* . . . AMERICAN FLANGE & MANUFACTURING CO., INC.



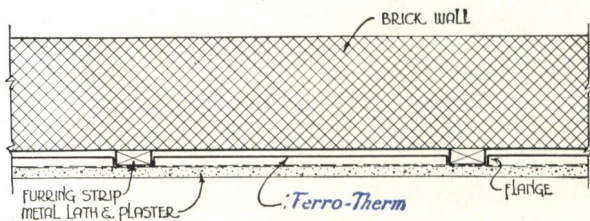
# TYPICAL DETAILS FOR INSTALLING *Ferro-Therm*



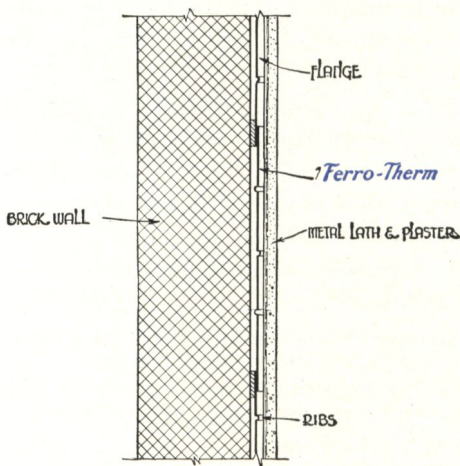
SECTION THRU SECOND FLOOR CEILING  
SHOWING *Ferro-Therm* installed on top of floor beams



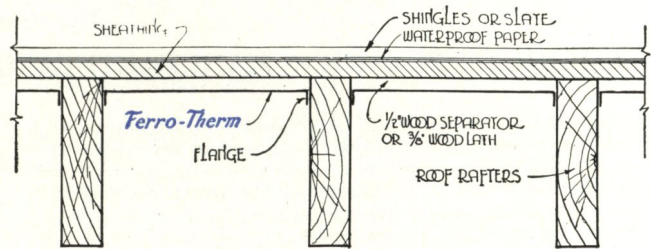
SECTION THRU SECOND FLOOR CEILING  
SHOWING *Ferro-Therm* FLANGED BETWEEN BEAMS



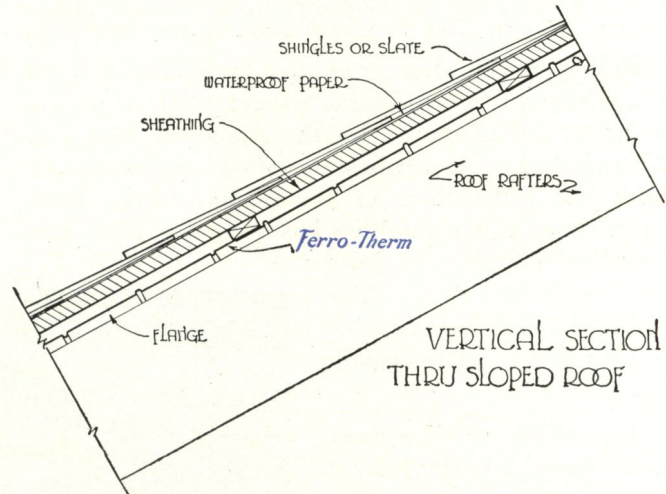
TYPICAL PLAN SECTION THRU BRICK WALL  
SHOWING *Ferro-Therm* installed between furring strips



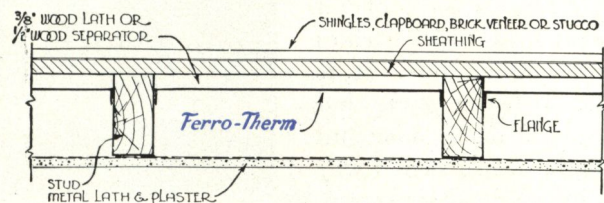
VERTICAL SECTION THRU BRICK WALL



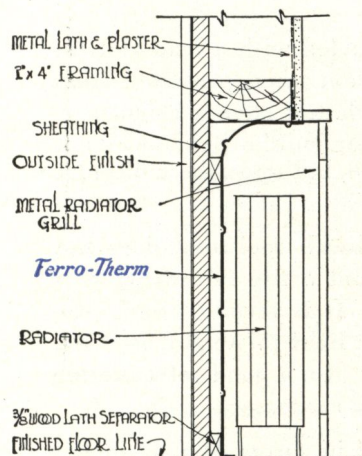
TYPICAL SECTION THRU SLOPED ROOF  
SHOWING *Ferro-Therm* installed between roof rafters



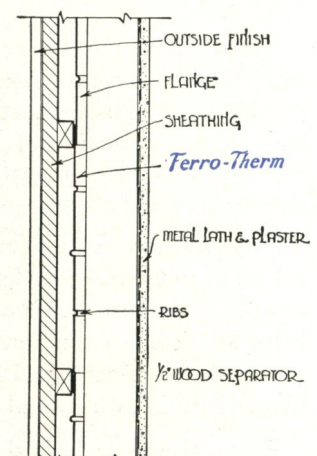
VERTICAL SECTION THRU SLOPED ROOF



TYPICAL PLAN SECTION THRU FRAME WALL  
SHOWING *Ferro-Therm* installed between studs



VERTICAL SECTION THRU RADIATOR ENCLOSURE



VERTICAL SECTION THRU FRAME WALL



**FERRO-THERM METAL HOUSE INSULATION***Manufactured by***AMERICAN FLANGE & MANUFACTURING CO., Inc., 30 Rockefeller Plaza, New York**

Investigating Committees of Architects and Engineers is a national association of committees organized to investigate anything of interest to an architect or an engineer in connection with the construction or equipment of buildings. The members of the committee, whose report follows, have been selected from the offices of practicing architects and engineers of high standing in their respective professions for the express purpose of this investigation. They have served without compensation, and are competent and absolutely unbiased. The activities of the organization are financed from the profits on the sale of bulletins to manufacturers who have won approval. The addresses of the members of this committee will be furnished any architect or engineer upon application to Ralph Moreton Hooker, General Secretary, Box 72 Church Street Annex, New York.

Full approval is hereby granted by the undersigned committee to "Ferro-Therm" sheet steel house insulation, manufactured by the American Flange & Manufacturing Co., when installed in accordance with the instructions of the manufacturer. Each member of this committee has seen this insulation applied on his own jobs and is thoroughly familiar with its application and behavior under service conditions.

Ferro-Therm is a sheet steel house insulation of such molecular structure that it reflects 95% of all radiated heat which strikes it from either side. It is stapled between studs and rafters and on to floor and ceiling beams in such a way as to insure dead air spaces. These not only add insulation but, as they are kept warm and dry by the radiated heat, prevent condensation.

Ferro-Therm sheets are coated with a lead and tin alloy which prevents corrosion when protected from the weather. These sheets do not have a bright surface, as the reflection of heat, unlike light, does not depend upon a bright surface, but upon the molecular structure of the metal.

Ferro-Therm does not absorb moisture, does not settle, is not combustible, but a fire retardant, as it affords a definite fire stop. It is vermin proof, protects the frame from rot, is light in weight, is easily handled and installed. It is also a good refrigerating insulation. It is installed by carpenters.

Ferro-Therm is furnished in sheets 24 x 32 inches which cut for studs, set 12 or 16 inches on centers, without waste, and with very little waste for rafters

spaced 20 inches. Sheets are stapled between studs or rafters through a half-inch flange. The sheets are crimped every four inches for stiffness. A knife cutter and a brake for turning the flange are furnished for use on the job, also magazine staplers which work with great rapidity.

Where sheets join, a wood lath or one-half inch furring strip is cut in between studs or rafters, and the sheets stapled to it with a half-inch lap.

The committee considers Ferro-Therm a superior house insulation because of the dead air spaces resulting from the method of its installation. The air in these spaces provides a definite insulation as it is dead, not in motion. Spaces of such size or shape as to permit the movement of air currents do not give effective insulation.

Ferro-Therm is strong enough not to tear and damage in handling and installation, and while not absolutely non-corrosive (the price of such a material being prohibitive for the purpose) it is the belief of this committee that the protective coating on the Ferro-Therm sheets, protected as they are within the wall, will be effective during the life of the wall.

The high radiant heat reflectivity of the Ferro-Therm sheets, combined with the non-conductivity of the dead air spaces, should make an

efficient and permanent insulation for the walls of frame buildings, and the roofs of all buildings. It can also be effectively applied between furring on masonry walls.

**Caution:**—It is important that Ferro-Therm should be protected from the weather until used, and that it shall not be painted.

Following this report the manufacturer presents catalogue matter which this committee considers properly describes and illustrates Ferro-Therm metal house insulation.

*Committee of New York Architects and Engineers*  
NORMAN H. BEHRENS of Sloan & Robertson, Architects.  
GARRETT J. COUCHOIS, Architect.  
BRADLEY DELEHANTY, Architect.  
HARRISON GILL, Architect.  
E. U. MARKUSH, Consulting Engineer.

December 30, 1937

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Residence . . . Bradley Delehanty, Arch.

*Ferro-Therm* . . . AMERICAN FLANGE & MANUFACTURING CO., INC.



# RATINGS OF EFFICIENCY OF *Ferro-Therm* FROM TESTS CONDUCTED BY RECOGNIZED AUTHORITIES

## A. S. OF REFRIGERATION ENGINEERS HANDBOOK

K Value is taken from tables on page 232 and 234, 1936 Edition of this book.

$K = 0.217$  B.t.u.'s per sq. ft. per hr. per °F. temp. diff.

## ARMOUR INSTITUTE OF TECHNOLOGY

Statement by Prof. J. C. Peebles, M.E., Armour Institute of Technology, Chicago, Illinois, after making tests of Ferro-Therm Metal Insulation:

"The Thermal conductivity results obtained from the flat plate tests showed lower results than I have obtained from any other type of insulation. It is also interesting to note that in the refrigerator tests no moisture was observed on the metal insulation or in the insulation space. This is contrary to the results obtained when the usual commercial forms of insulation are used. . . ."

$K = 0.226$  B.t.u.'s per sq. ft. per hr. per °F. temp. diff.

## For Calculations in Designing Adequate Heating and Air Conditioning Systems:

Exterior Walls — Shingle, Clapboard or Brick Veneer Construction with Sheathing — 1 sheet of Ferro-Therm installed between Studs — Lath and Plaster.

$U = 0.10$  B.t.u.'s per sq. ft. per hr. per °F.

Solid Masonry Walls 1 x 2 in. Furring — 1 sheet of Ferro-Therm installed between Furring — Lath and Plaster.

$U = 0.10$  B.t.u.'s per sq. ft. per hr. per °F.

Roof — Shingle Roof, Sheathing over Rafters — 1 sheet of Ferro-Therm between Rafters—Lath and Plaster.

$U = 0.10$  B.t.u.'s per sq. ft. per hr. per °F.

Combined Value of Pitched Roof insulating with 1 sheet of Ferro-Therm and second floor ceiling consisting of Lath and Plaster, Joists, Rough Flooring.

$U = 0.05$  B.t.u.'s per sq. ft. per hr. per °F.

## SPECIFICATIONS FOR INSTALLING *Ferro-Therm*

### Insulation for Residences

Scope. Insulation shall be installed in the following locations, (list locations, cellar, ceiling, exterior walls, walk and roof of enclosed porch, attic floor, all roofs, radiator pockets.)

### Insulation Material and Protection

Insulation for the above locations shall be Ferro-Therm Metal Insulation in sheets 24 x 32 in. as manufactured by American Flange & Mfg. Co., 30 Rockefeller Plaza, New York City. Ferro-Therm shall be delivered at the job in original package and shall be protected from the weather until used.

### Installation of Insulation

Ferro-Therm shall in general be cut to fit between studs or rafters turning  $\frac{1}{2}$  in. flange on each long side for stapling to the face of the studs. Staples shall be as supplied with the Ferro-Therm and shall be set not less than 6 in. apart.

### Roof Insulation

Entire roof, including flat or sloping surfaces and sides and roofs of dormer and gables, shall be insulated with Ferro-Therm. After permanent roof finish is applied, Ferro-Therm shall be installed between the rafters, from plate to ridge, and furred off  $\frac{3}{8}$ - $\frac{1}{2}$ " from the underside of the sheathing with common wood lath or furring strips nailed to the sheathing and spaced so that ends of Ferro-Therm sheets shall lap 1". The Ferro-Therm shall be stapled through the furring strips and through the flanged edges to the rafters.

### Attic Floor Installation

Ferro-Therm Metal Insulation shall be installed over the joists or beams of the entire attic after the roof is covered in. Sheets shall be installed flat with overlaps of approximately 1 in. and stapled to the joist not more than 6 in. apart. Where rough floor is to be laid, furring strips should be laid above each beam over the Ferro-Therm before applying rough floor.

Sheets shall be cut and fitted at all plates and openings to prevent infiltration of air at these locations.

### Exterior Walls

Masonry—Ferro-Therm Metal Insulation shall be installed on furring strips on all masonry walls. The sheets of Ferro-

Therm shall be cut and flanged to fit snugly between the furring strips. Horizontal wood lath strips shall be fastened to the top of each sheet by staples before the sheet is fitted between the furring strips. Each sheet shall then overlap the sheet below by approximately 1 inch over the lath strip and shall then be stapled to the lath strip. Sheets shall then be stapled through the flanged edges to the furring strips. All staples shall be spaced not more than 6 inches apart. All sheets shall be fitted at plates, sills and around windows and doors to prevent infiltration of air at these locations.

### Frame or Veneer Walls

Ferro-Therm Metal Insulation shall be installed between the studs of all interior walls, including (enclosed porches, bay windows or other projection or recesses).

Note—Floors of overhanging bay windows, rooms above unheated porches, or over unexcavated portion, etc., should be insulated with Ferro-Therm in the same manner as the roof except that the insulation should be placed  $\frac{3}{8}$  in. from the bottom of the floor beams.

### For Wood Sheathed Walls

The sheets of Ferro-Therm shall be cut and flanged to fit snugly between the studs. Horizontal furring of  $\frac{3}{8}$  in. wood lath or  $\frac{1}{2}$  in. furring strips, shall be stapled to the inside face of wood sheathing between the studs at all horizontal joints between sheets of Ferro-Therm.

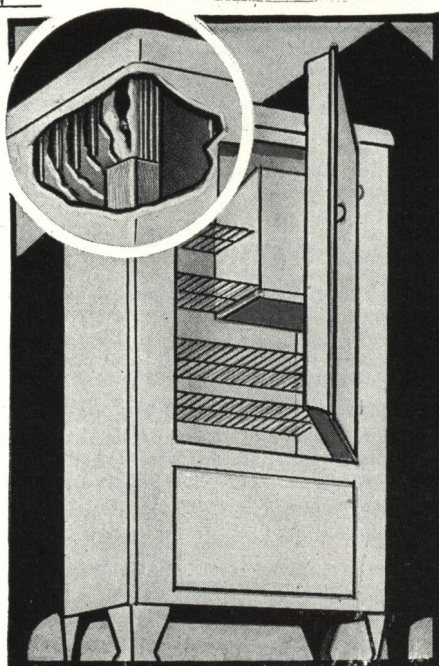
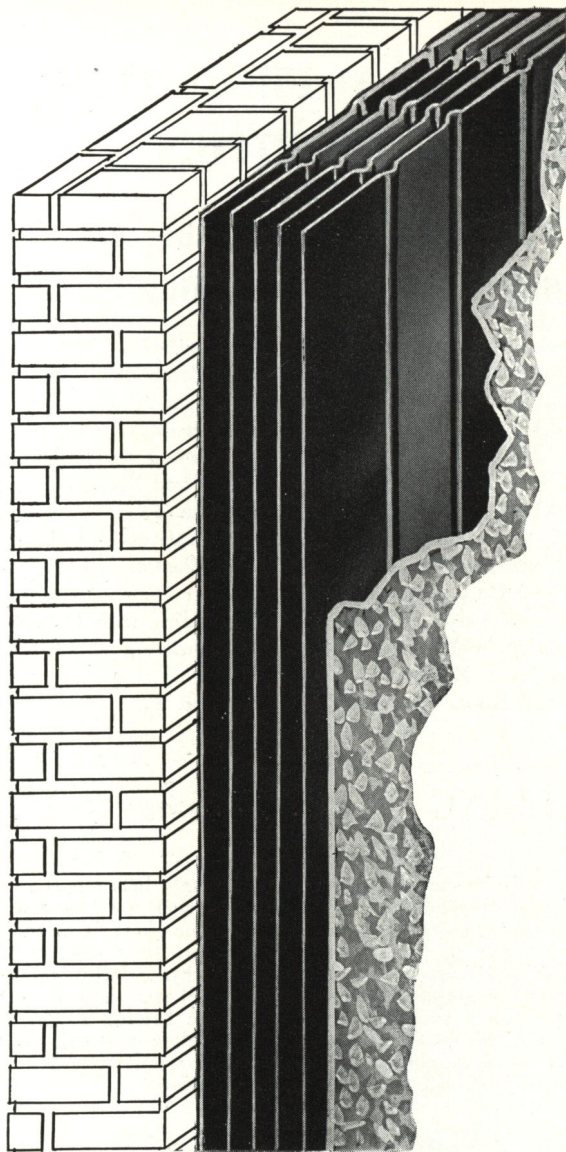
The sheets of Ferro-Therm shall be lapped 1 in. over the furring strips and stapled to them and to the studs through the flanged edges not less than 6 in. apart. All sheets shall be fitted at plates, sills, around windows, doors and other openings to prevent infiltration of air at these locations.

### Radiator Pockets in Interior or Exterior Walls

All radiator pockets for enclosed or exposed radiators shall be lined with Ferro-Therm Metal Insulation on back, sides and top as directed by the architect or according to details.

Note—(Ferro-Therm must not be painted as it will lose  $\frac{2}{3}$  of its insulation and reflecting efficiency).





*Ferro-Therm* As Used in Cold Storage  
and Ice Box Construction

# *Ferro-Therm*

For

## REFRIGERATION

### Requirements for a Good Refrigeration Insulation

For many years refrigeration engineers have searched for the ideal insulation material for cold storage use.

Some of the most important requirements for such a material are:

1. High insulating value.
2. Positive non-absorption of moisture.
3. Resistance to disintegration from moisture.
4. Resistance to deterioration which causes loss of efficiency in insulating value.
5. Resistance to rodents and vermin.
6. Elimination of the necessity for continually renewing insulation.
7. Non-absorbing of, or giving off of, odors or gases.
8. Low in cost.
9. Low operating cost for high efficiency.

### *Ferro-Therm* AN IDEAL INSULATION

*Ferro-Therm* is an insulation which answers all of these requirements.

#### (1) High Insulating Efficiency

As has been previously described, the efficiency of *Ferro-Therm* is based on entirely different principles from those of mass insulators.

It has also previously been stated that radiant heat is responsible for from 60 to 80% of heat losses. In refrigeration it is the great proportion of radiant heat which must be prevented from entering the refrigerator from the outside in comparison with heat from conduction, which is important.

*Ferro-Therm* reflects 95% of the radiant heat which tries to enter the refrigerator from the outside. This high reflectivity, plus the efficiency of the dead air spaces between the sheets of *Ferro-Therm*, accounts for its extraordinarily low K value.

#### (2) Resistance to Moisture

*Ferro-Therm* being a metal will not absorb moisture, therefore moisture cannot collect in it.

#### (3) Protection from Deterioration

*Ferro-Therm* is protected from corrosion by a non-corrosive coating and does not disintegrate as absorbing products do.

#### (4) Retains Its Efficiency

*Ferro-Therm* retains its efficiency permanently. It does not require a bright polished surface but depends on the molecular structure of the steel for its reflective qualities which are permanent.



## (5) Resistance to Rodents, Vermin, Bacteria and Micro-Organisms

It is impossible for rats and vermin to chew tunnels and make nesting places in this steel insulation. It will not support life for rodents.

## (6) Not Necessary for Periodical Renewal

The destruction caused by rodents and by loss of efficiency and deterioration caused by absorption of moisture is entirely absent when Ferro-Therm is used.

## (7) Non-Absorption of Odors or Gases

As Ferro-Therm is a metal it will not absorb gases or odors and therefore cannot give them off.

## (8) Low in Cost

In addition to its efficiency it is very low in its cost for material and installation.

## (9) Low Operating Cost

As it has extremely high efficiency in insulating value and as this value is permanent it assures a constant efficiency value after installation.

## A Report of Interest to Refrigeration Engineers

The following excerpts from a report of tests made by J. C. Peebles, M.E., Armour Institute of Technology, Chicago, Ill., give some very interesting information. This is especially true with regard to the condition of absence of moisture.

"A number of refrigerator tests have been conducted with five leading makes of electric domestic refrigerators. In these tests your metal insulation was compared with the insulating material originally installed in the refrigerator by the manufacturer.

"The thermal conductivity results obtained from the flat plate tests showed lower results than I have obtained from any other type of insulation. In one case I obtained as low as 0.195 B.t.u.'s per hour, per square foot of material, per degree Fahrenheit of temperature difference between the surfaces of the material for one inch thickness.

"The results obtained from the refrigerator tests indicate that your metal insulation is superior to any other insulation now being used for refrigeration work. It is also interesting to note that in the refrigerator tests *no moisture was observed on the metal insulation or in the insulation space. This is contrary to the results obtained when the usual commercial forms of insulation are used.*"

## The United States Government Specifies *Ferro-Therm*

### STANDARD GOVERNMENT FORM OF CONTINUATION SCHEDULE FOR FORM 31 OR 33 (SUPPLIES)

#### SCHEDULE OF SUPPLIES — INSTALLED ICE BOXES FOR C.C.C. CAMPS AND SECOND CORPS AREA

Ice Box Specifications: Note: The contractor must furnish and deliver all material according to specification and all labor for proper construction and erection of the ice box and equipment in accordance with this specification and drawing No. 607-E. Copy of this drawing will be furnished bidder upon request.

Information to Be Furnished with Bid: Each bidder shall submit with his bid, a complete description of the type of material he proposes to furnish and proposed construction which will enable the contractor to guarantee a temperature to be maintained from *not more than 35 degree to 40 degree Fahrenheit*, under normal service conditions. Insulation to have an over-all thermal conductivity of .1 B.t.u. per square foot per hour per degree (Fahrenheit) temperature difference.

Construction: Insulating Material in walls, ceiling, door, and floor to be *Ferro-Therm metal insulation* consisting of four (4) parallel spaced metal sheets or material of equal *high thermal-insulating value and resistance to moisture*. Insulating material shall be properly installed and supported. It may fill space between walls to insure protection against infiltration of air and moisture.

## Where *Ferro-Therm* is Used

Ferro-Therm is specified wherever refrigeration is used in such construction as:

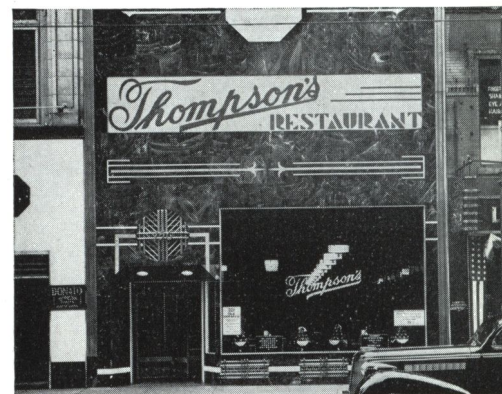
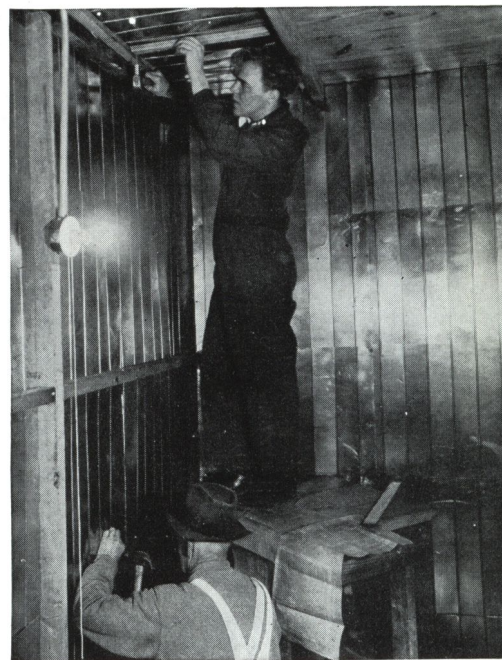
Cold Storage Rooms	Cold Storage Buildings	Refrigerated R.R. Cars and Containers
Ice Boxes and Refrigerators	Breweries	Dairies
Hospitals	Beer Cooling Rooms	Ice Cream Plants
Fur Storage	Refrigerator Trucks	Refrigerator Ships

## Services

The services of a fully equipped laboratory and a trained engineering staff are free to prospective users for the purpose of designing the most efficient combination of Ferro-Therm metal insulation for specific purposes.

Write to the American Flange and Mfg. Co. for complete engineering data and estimates on refrigerator constructions insulated with Ferro-Therm.

New York Address: 30 Rockefeller Plaza, New York City



Buildings and Cold Storage Rooms  
Insulated with *Ferro-Therm*

AMERICAN FLANGE & MANUFACTURING CO., INC.... *Ferro-Therm*





The Colonial Village at Clairton, Pa., pictured above, consisting of 600 houses, is completely insulated with Ferro-Therm Metal Insulation. Gilbert Varker, Inc., Engineers responsible for the use of particular materials in this mammoth project delved deeply into the merits of all types of insulation. Ferro-Therm Metal Insulation fulfilled all of the requirements for perfect comfort and economy.

## A FEW REPRESENTATIVE RESIDENCES INSULATED WITH FERRO-THERM



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## SOME ARCHITECTS

Randolph H. Almiroty  
Beers and Farley  
Reuben H. Bowden  
Geo. P. Butler, Jr.  
Edward B. Caldwell

Henry T. Child  
G. J. Couchois  
Matthew W. Del Gaudio  
Dodge and Morrison  
H. I. Feldman

BUILDING  
TECHNOLOGY  
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Gillies, Campbell, Builders  
New York World's Fair, 1939, Inc.  
Skinner, Cook & Babcock, Inc., Builders  
Kuhn, Smith & Harris, Inc., Builders  
O'Brien & Kinkel, Builders

Rest  
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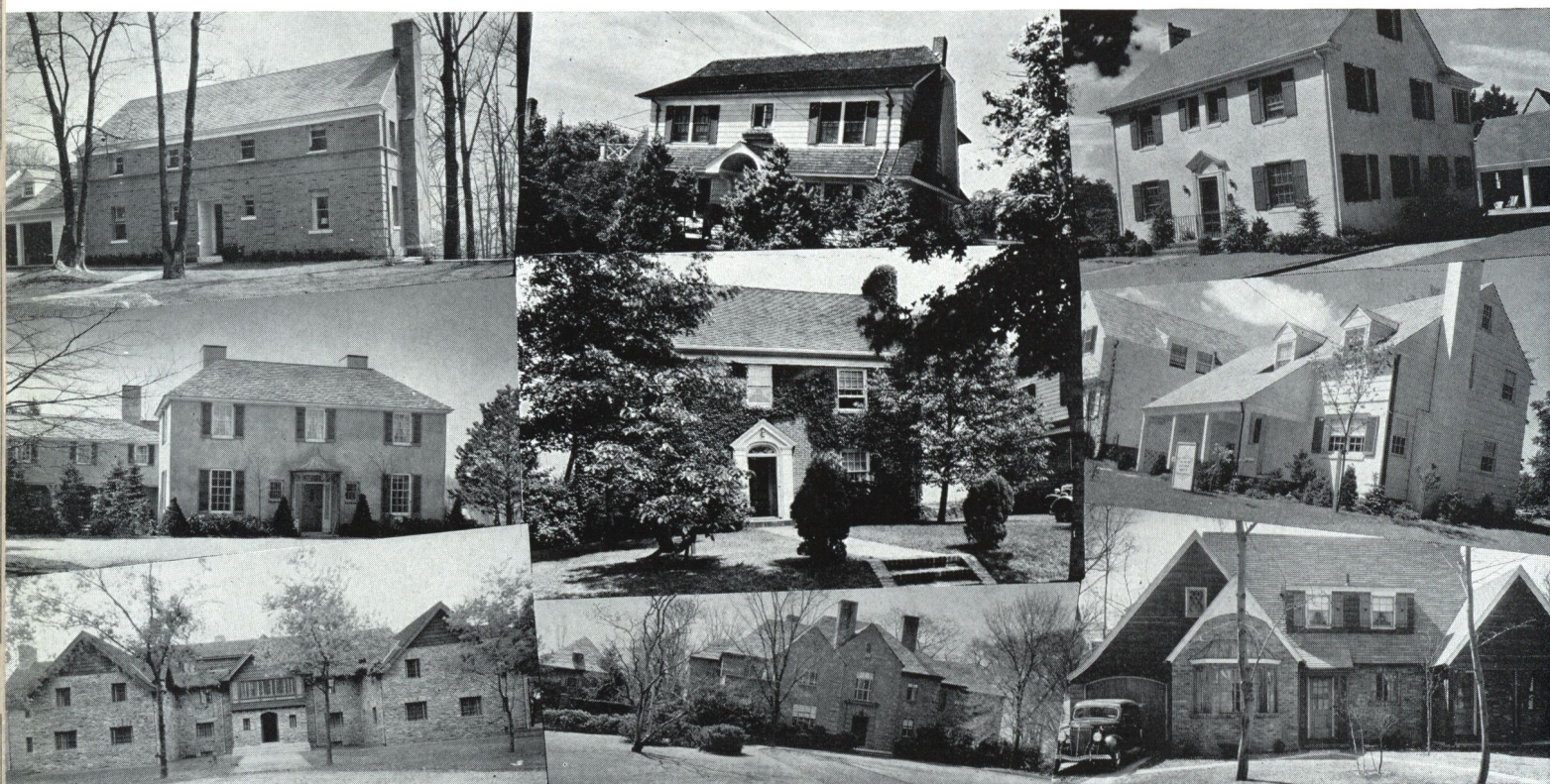
From the collection of:  
Robert Vail Cole Jr, AIA  
1962 – 2011





The Colonial Village at Clairton, Pa., pictured above, consisting of 600 houses, is completely insulated with Ferro-Therm Metal Insulation. Gilbert Varker, Inc., Engineers responsible for the use of particular materials in this mammoth project delved deeply into the merits of all types of insulation. Ferro-Therm Metal Insulation fulfilled all of the requirements for perfect comfort and economy.

## A FEW REPRESENTATIVE RESIDENCES INSULATED WITH FERRO-THERM



## SOME ARCHITECTS WHO SPECIFY FERRO-THERM

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Dodge and Morrison  
H. I. Feldman

Harrison Gill  
Henry C. Hahn  
Phillip Ives  
Kimball and Husted  
Knappe and Morris  
Frank J. Foster

Morris and O'Connor  
O'Hara and Edson  
Douglass Orr  
Russell and Clinton  
Wm. Edgar Shepherd

Walter John Skinner  
Sloan and Robertson  
Dwight Smith  
F. G. C. Smith  
W. Stewart Thompson

## OTHER USERS OF FERRO-THERM

Gillies, Campbell, Builders  
New York World's Fair, 1939, Inc.  
Skinner, Cook & Babcock, Inc., Builders  
Kuhn, Smith & Harris, Inc., Builders  
O'Brien & Kinkel, Builders

Restland Management Corp.  
The Barrett Co.  
The DuPont Co., Belle, W. Va.  
The General Electric Co.  
The United States Army

Johnston Livingston Co., Inc., Builders  
Ridgefield Lakes, Inc., Builders  
John R. Thompson Co., Restaurant  
The Westinghouse Co.  
Kraushaar Bros., Architects & Builders